

# DNA probe aids bovine herpes detection

FORT COLLINS, Co. — A highly technical DNA probe, created only recently for human research, has been adapted to identify bovine herpes, a virus that causes significant losses in the cattle industry.

The adapted probe, developed at Colorado State University, can pinpoint the virus that traditionally has been difficult to identify in tissue samples removed from cattle suspected of being afflicted with bovine herpes.

Once the virus is identified, operators will be able to cull out infected cattle. The virus is believed to play an important role in causing abortions in dairy cows and illnesses and deaths due to respiratory disease in feedlot cattle.

The probe also is expected to help researchers trace the path of the virus through an animal — a process that could aid research on human herpes.

"The probe could show us how the virus moves through an infected cow, whether it infects the reproductive tract and if it remains latent and can be a potential to cause future abortions," said Dr. Carol Blair, CSU microbiologist in charge of the research.

"We think it will help in developing a successful and safe vaccine for cattle. In turn, we hope that can be used as a model for developing a vaccine for human herpes."

The USDA-funded project is a collaboration with CSU researchers Barry Beaty, a microbiologist, and Richard Bowen, a physiologist.

The CSU probe was adapted from a breakthrough made by Dr. David C. Ward, department of Human Genetics, Yale University School of Medicine.

Ward used molecular biology to develop a diagnostic probe that allows scientists to put a non-radioactive label on virus DNA (deoxyribonucleic acid), the raw material of all heredity. Then, researchers can use the labeled DNA to locate and identify viruses in human tissue.

The DNA probe is beneficial because it can find a virus even if tissue is in bad shape. "The virus

DNA is frequently protected even if the specimen has deteriorated," Blair explained. "It remains in the nucleus of the cells and is protected from the enzymes that break down the infectious virus in the tissue."

The process of finding foreign DNA has been used for several years, only with radioactive labels. However, because radioactive material was needed, the method has not been commonly used in diagnostic labs, especially in the cattle industry. The new non-radioactive method will allow wider use of the method.

"Most diagnostic laboratories haven't been in the position to use radioactive material," Blair said. "They don't have a license to use it, or they can't dispose of the material properly. Or their technicians don't know how to use it. But now a diagnostic lab can take tissue that is in bad shape and test it with the non-radioactive probe."

Blair will discuss the probe and research on bovine and human herpes in a 1 p.m. presentation April 14 at CSU's Veterinary Teaching Hospital as part of the annual open house for the university's College of Veterinary Medicine and Biomedical Sciences.

The bovine herpes research is part of a project that began as a

joint effort among researchers here and at the University of Colorado Health Sciences Center, Denver.

CSU researchers are trying to develop a vaccine for bovine herpes that also can be used as a model to assist scientists at the Health Sciences Center create a human vaccine.

The research is developing into many questions that researchers have been unable to answer about either human or bovine herpes.

One question is how bovine herpes moves through an animal.

Bovine herpes is believed to enter as an airborne virus through an animal's nasal passages. Then, it moves to sensory nerve ganglia in the head.

From there, speculates the most

popular theory, the virus moves in white blood cells to the reproductive tract where it can cause abortions.

There is concern that the virus might remain latent. If this is true, infected bulls used for artificial insemination might be able to pass on infected semen.

"But this hasn't been proven," Blair said. "We're hoping that with the probe we can find out if the virus does move this way and whether it remains latent once in the reproductive tract."

Vaccines have been used in the last two decades to prevent bovine herpes, but the treatments unfortunately are not completely effective, Blair said.

Despite the vaccines, the loss from bovine herpes is millions of

dollars a year. "In Colorado, it amounts to hundreds of thousands of dollars," Blair added.

As with humans infected with herpes, stress is believed to play an integral role in causing bovine herpes to flare up in cattle, even vaccinated animals.

"When vaccinated cattle are shipped to feedlots, their immunity apparently breaks down from the stress of being moved and crowded together," Blair said. "They often get infected and they don't eat. In a feedlot, it's important that they do eat. That's why they are there."

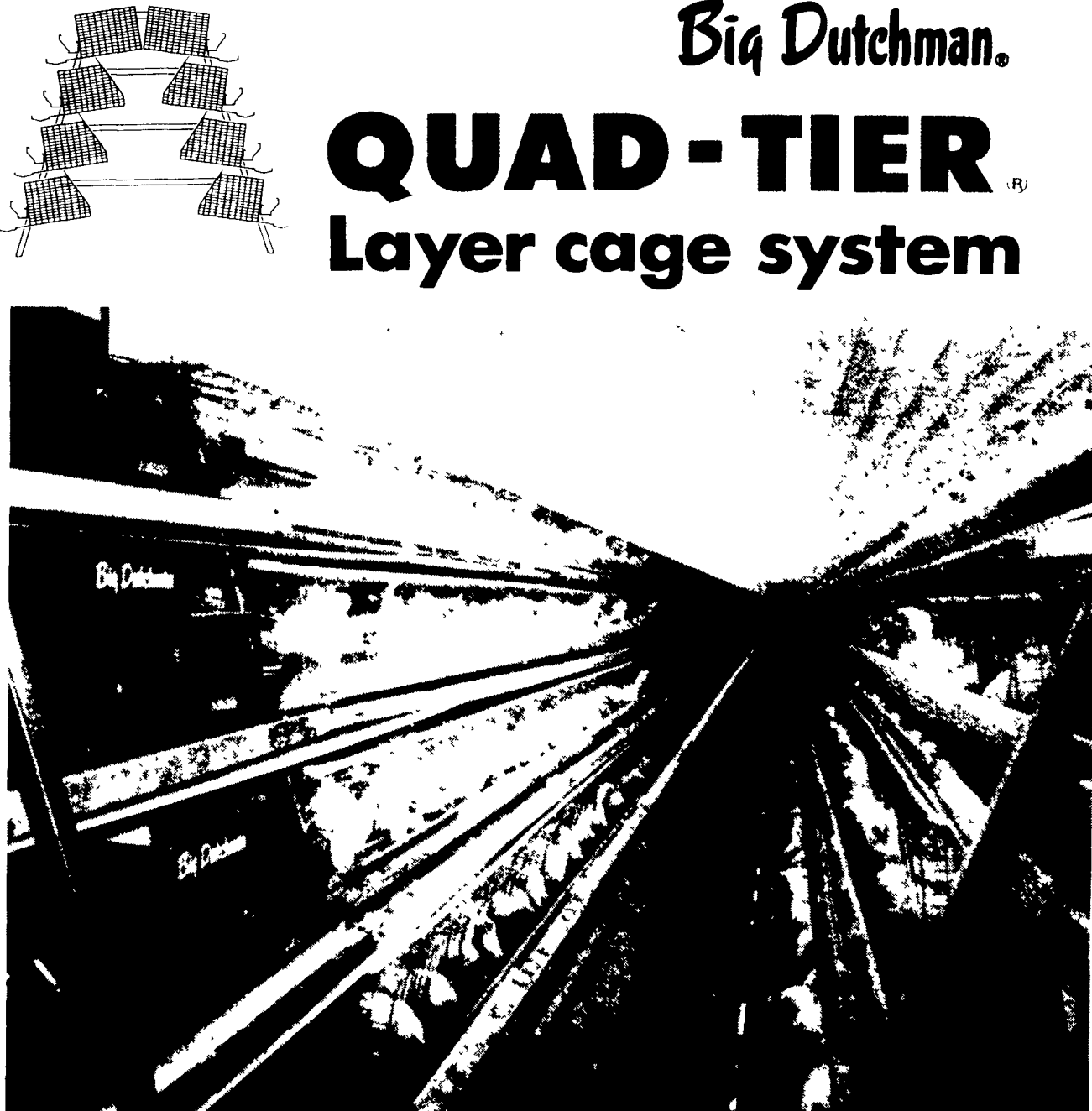
"So that is an economic loss. But it can be worse. Somehow the virus leaves their respiratory tract open to bacterial pneumonia that frequently will kill the animals."



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